

**Environmental Systems & Societies**

***Measuring a Population***

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| **Name:** |  | **Due Date:** | -- |
| **Teacher:** | Hellendag | **Grade (circle):** | 11/12 |
| **Subject:** | Enviromental Systems and Societies | **Level (circle):** | SL |

**Authenticity Declaration**

* I verify that this is my own original work.
* The ideas and/ or works of others have been acknowledged. (including music, images, graphs etc)
* I have not received substantial assistance from any other person when completing this work
* I have submitted this work to turnitin.com YES/ NO

Student Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Homeroom:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date Submitted: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Relevant IB Topic: Biodiversity & Conservation, The Ecosystem**

**Criteria Assessed: DCP, & DEC**

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| **Criterion** | **Aspect 1** | **Aspect 2** | **Aspect 3** | **Total** |
| **Planning** | NA | NA | NA | NA |
| **Data collection and processing** |  |  | NA |  |
| **Discussion, evaluation and conclusion** | NA |  |  |  |

**Task**

Carry out an investigation to measure the size of a cricket population.

**Mark Recapture of Crickets**

**Aim:** To estimate the population size of a population of captive crickets using the Lincoln Index Method, aka the Mark-Recapture Method.

**Background:** Scientists and ecologists often need to determine the population size of a species in an area. If certain criteria are met, they can use the Lincoln Index Method. In this method, organisms are collected, marked in some way, and released back to their original environment. After a specified time has passed, this same organism is collected again and checked for existing marks.

In order to use this method, certain criteria must be met:

1. The population is “closed”; organisms have to stay in the area
2. There is no migration or immigration
3. Marks don’t harm the organism or make them more susceptible to predators
4. Marks should be permanent or not easily lost between captures.

**Lincoln Index Calculation:**

where n1 is the number originally caught & marked

where n2 is the number recaptured

where m2 is the number recaptured & marked

**Materials (per group)**

Small Brown Crickets (unknown number)

Nail Polish or Non-toxic Paint

10 gallon fish tank

Enough potting soil and shredded paper to cover the bottom of the tank

Netting to cover the top of the tank

2 Large cardboard egg cartons

1 Plastic bowl

10 Q-tips

**Methods**



1. Carefully remove a piece of cardboard egg carton from the tank. This is one place the crickets like to live. Be careful not to knock off any crickets.

leg

1. Knock the crickets into your bowl. Be sure they don’t jump out.
2. One student will carefully hold the cricket. Be sure to be gentle.
3. The other student will carefully mark the cricket with a small dot of nail polish (this should be very small and thin, just enough to see). You may want to use a matchstick to mark them. *You will be given instructions about WHERE to mark them. Use Figure 1 to help you.*

thorax

Figure 1. Cricket

1. Record the number of crickets that you have marked.
2. Carefully place the crickets back into the tank.
3. After 15 minutes perform steps 1-2 to recapture crickets.
4. Working as a pair, determine how many of your recaptured crickets have already been marked.
5. Tabulate your data as a class and calculate population size using the Lincoln Index Formula.

**DCP-** You will be assessed on Aspects 1 & 2 (Recording Raw Data & Processing Raw Data)

**DEC-** You will be assessed on Aspects 2 & 3 (Evaluating & Concluding)